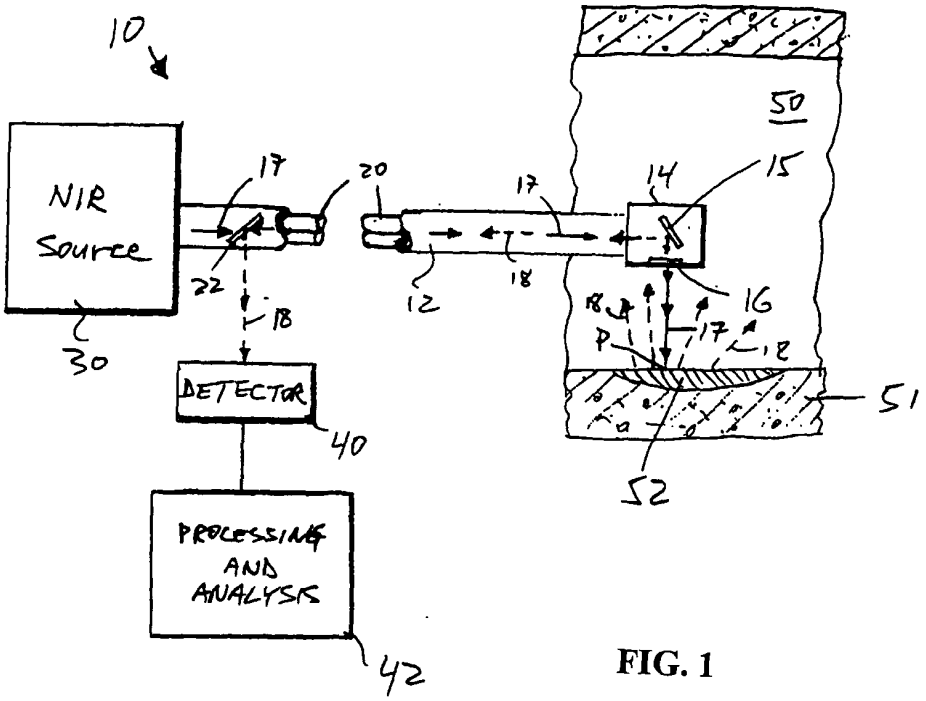

10
NIR Source
17
20
22
18
30
DETECTOR
40
PROCESSING AND ANALYSIS
42
12
17
18
14
15
16
50
51
52

FIG. 1

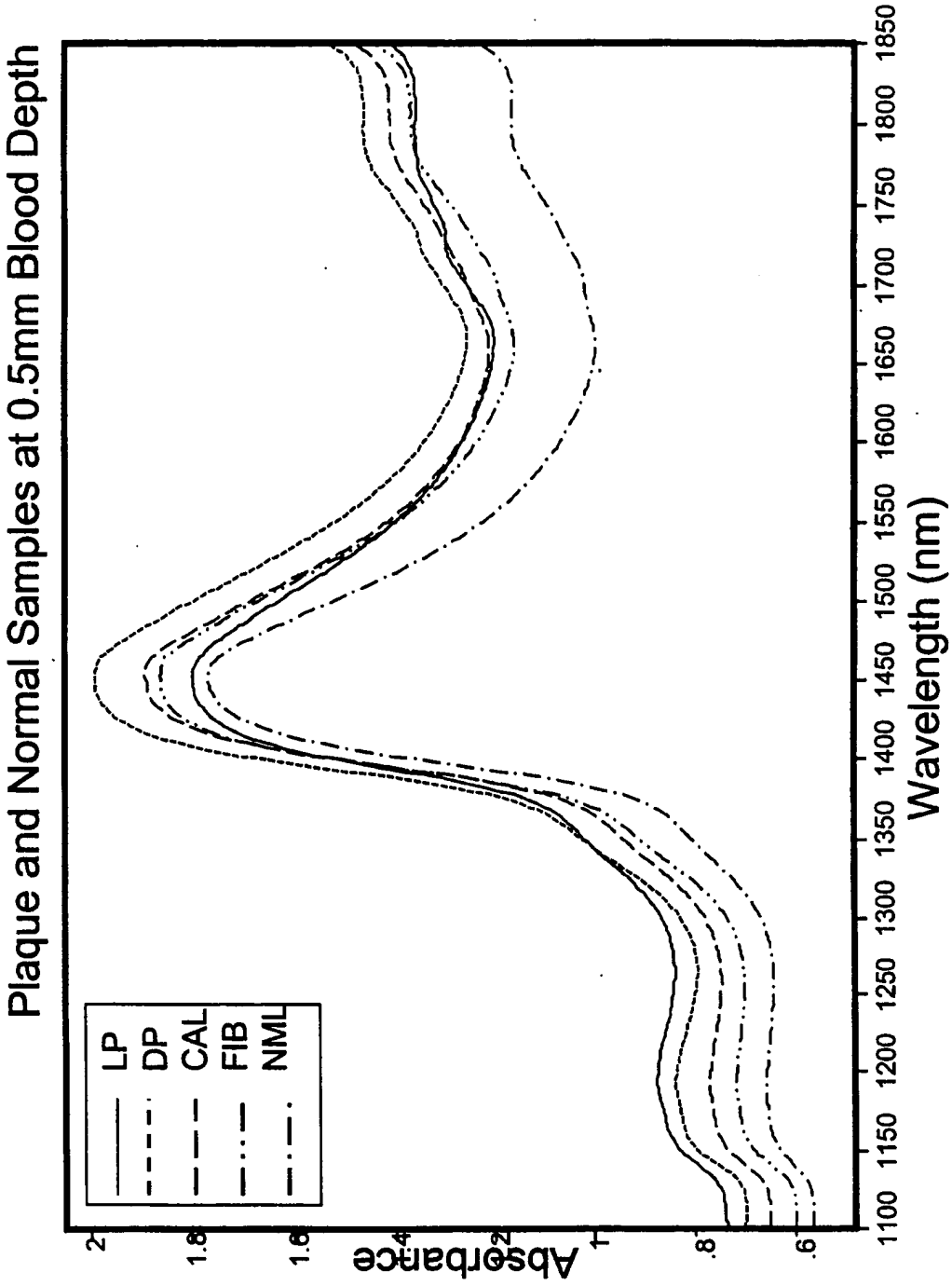

Plaque and Normal Samples at 0.5mm Blood Depth
LP
DP
CAL
FIB
NML
Absorbance
Wavelength (nm)
2
1.8
1.6
1.4
1.2
1
.8
.6
1100
1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800
1850

FIG. 2

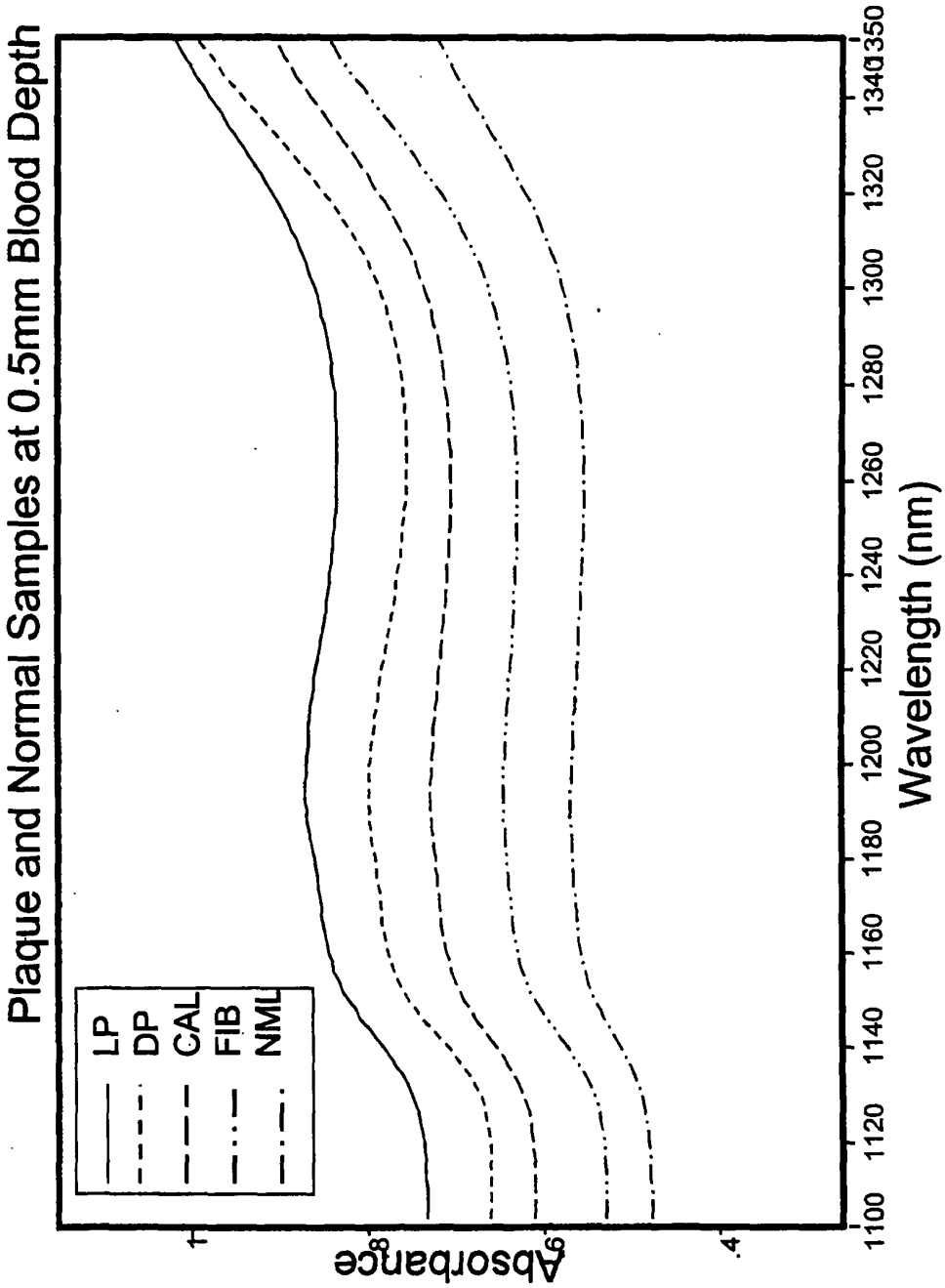
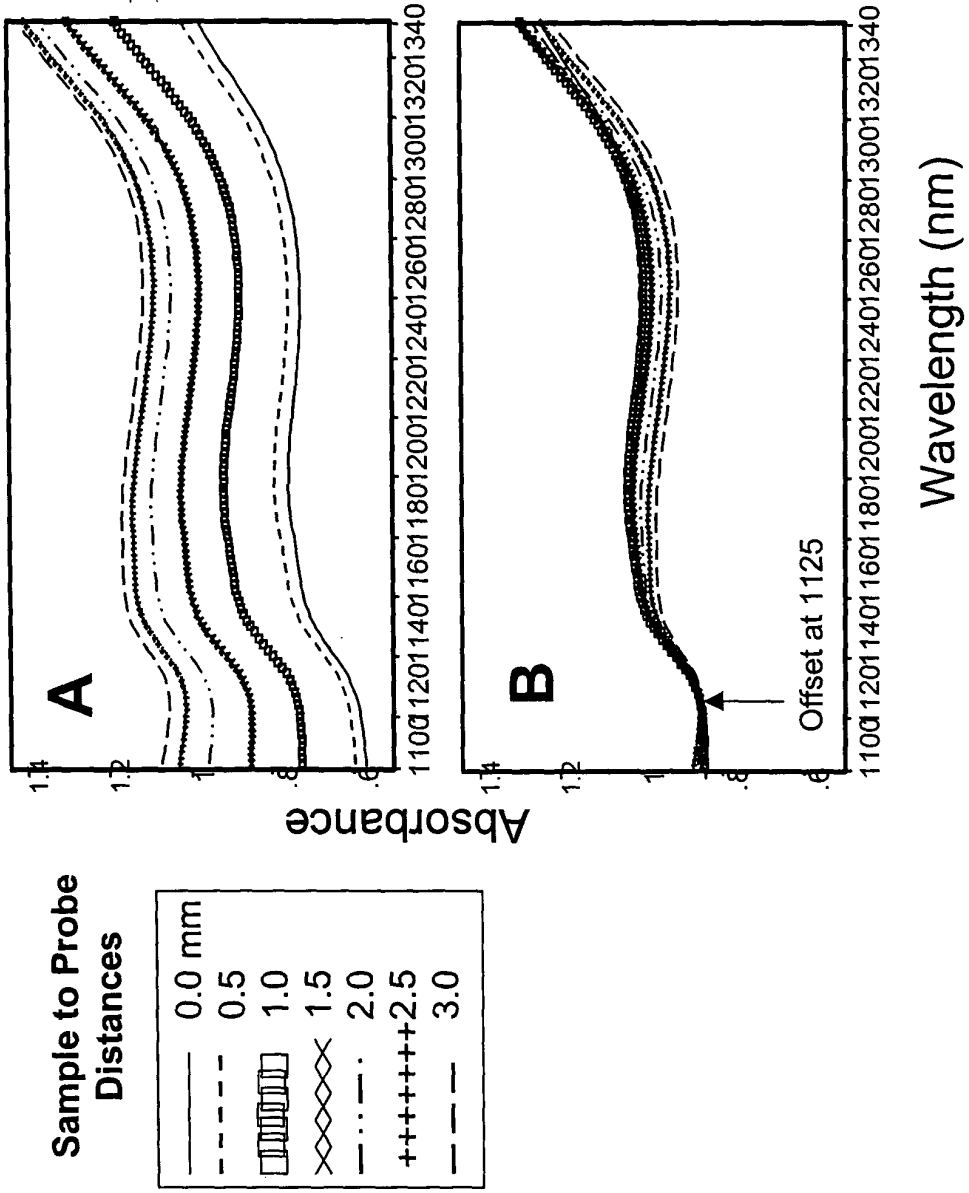

Plaque and Normal Samples at 0.5mm Blood Depth
LP
DP
CAL
FIB
NML
Absorbance
1
.8
.6
.4
Wavelength (nm)
1100
1120
1140
1160
1180
1200
1220
1240
1260
1280
1300
1320
1340
1350

FIG. 3

FIG. 4A

FIG. 4B


A
B
Absorbance
Wavelength (nm)
Offset at 1125
Sample to Probe Distances
0.0 mm
0.5
1.0
1.5
2.0
2.5
3.0

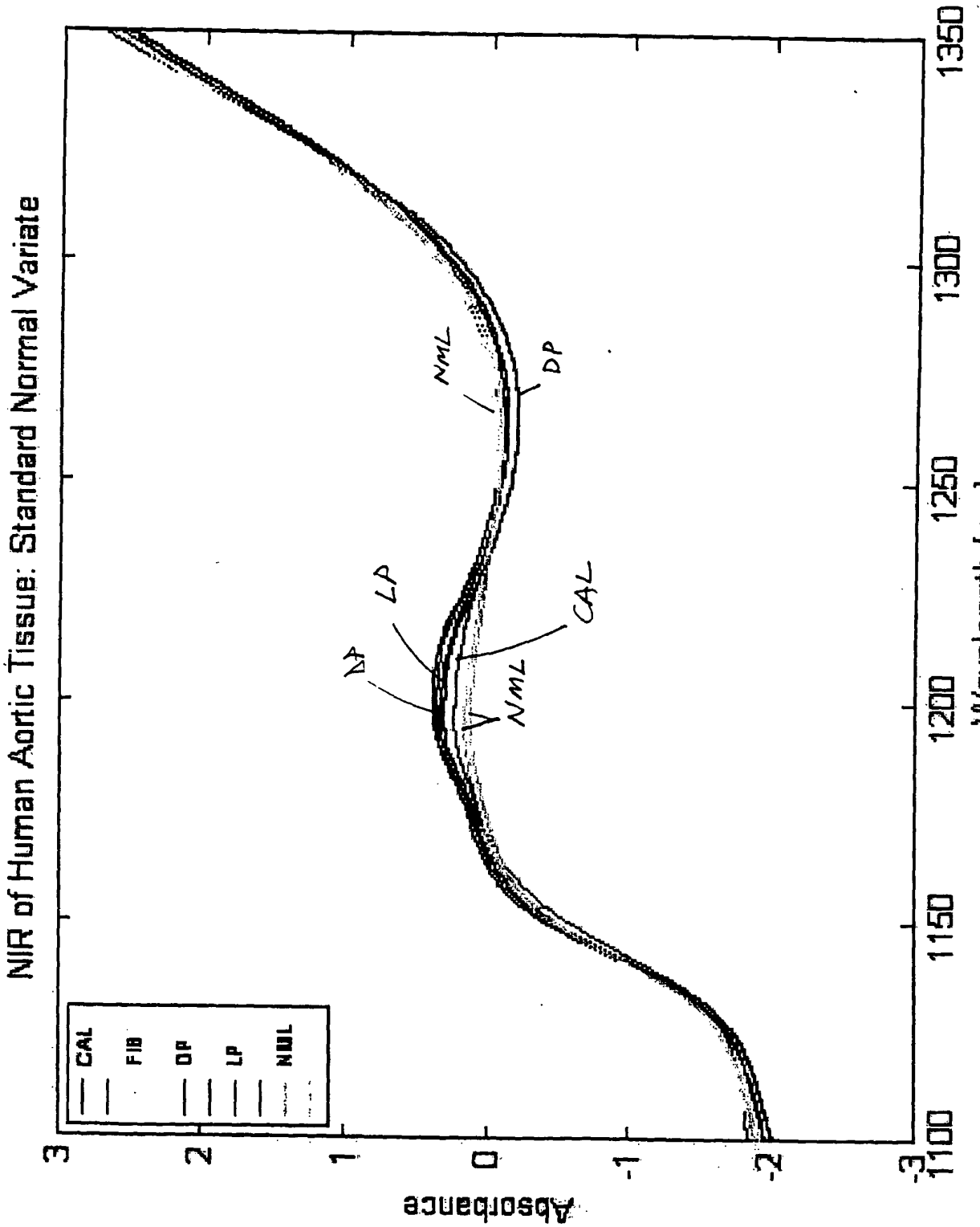

NIR of Human Aortic Tissue: Standard Normal Variate
Absorbance
Wavelength [nm]
3
2
1
0
-1
-2
-3
1100
1150
1200
1250
1300
1350
CAL
FIB
DP
LP
NML
NML
DP
LP
CAL
NML

FIG. 5

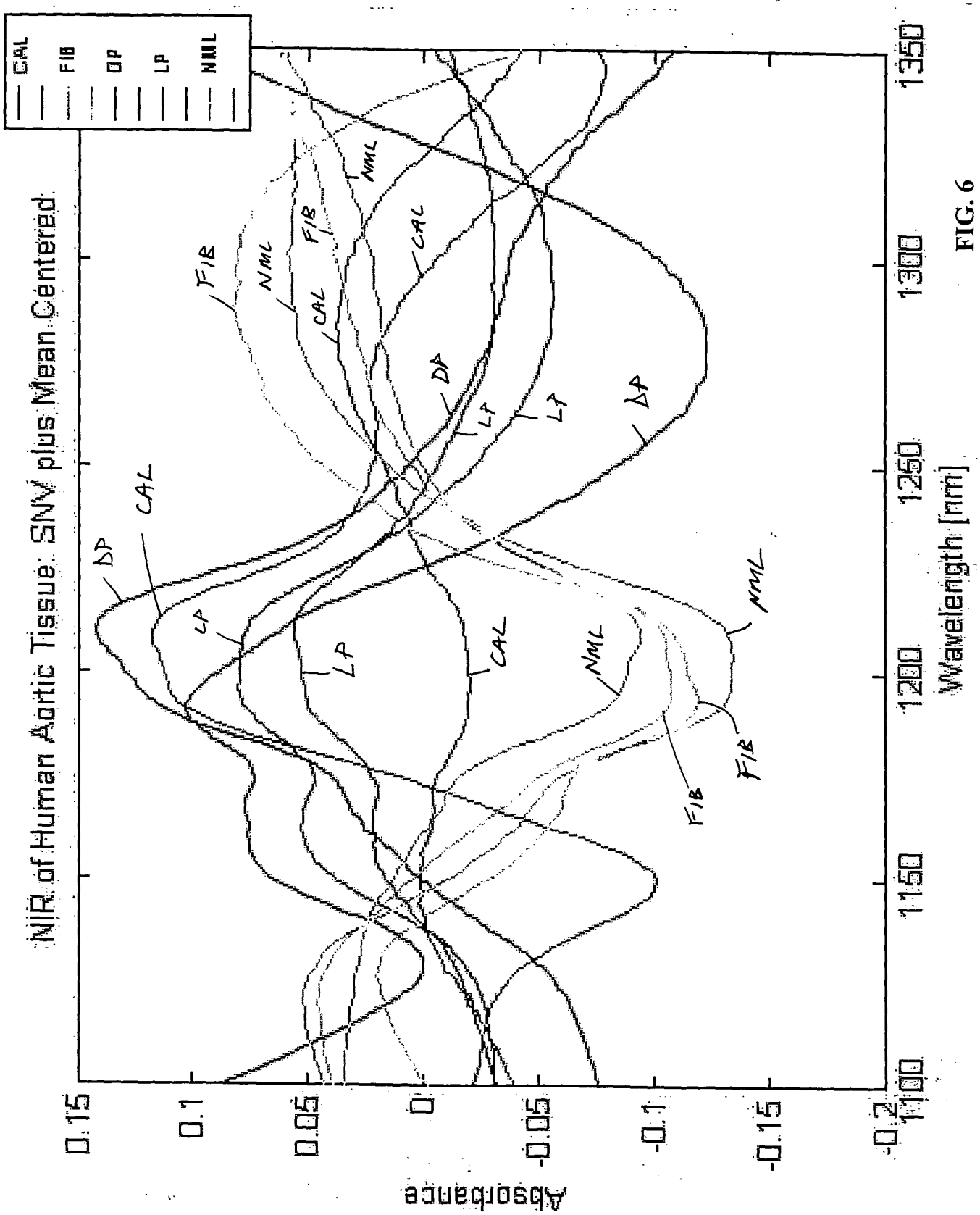

CAL
FIB
DP
LP
NML
NIR of Human Aortic Tissue: SNV plus Mean Centered
Absorbance
Wavelength [nm]
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
1100
1150
1200
1250
1300
1350

FIG. 6

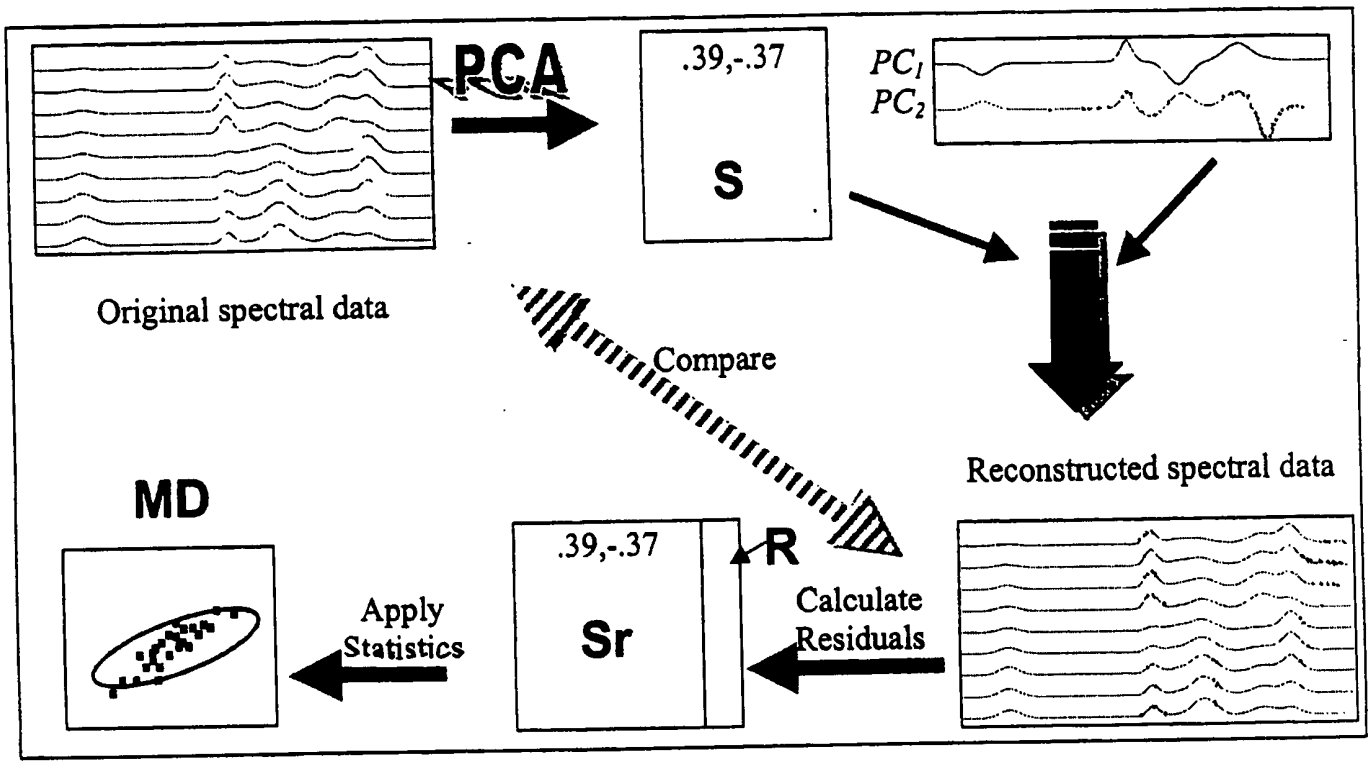

PCA
.39,-.37
S
PC_1
PC_2
Original spectral data
Compare
Reconstructed spectral data
MD
.39,-.37
Sr
R
Apply Statistics
Calculate Residuals

FIG. 7

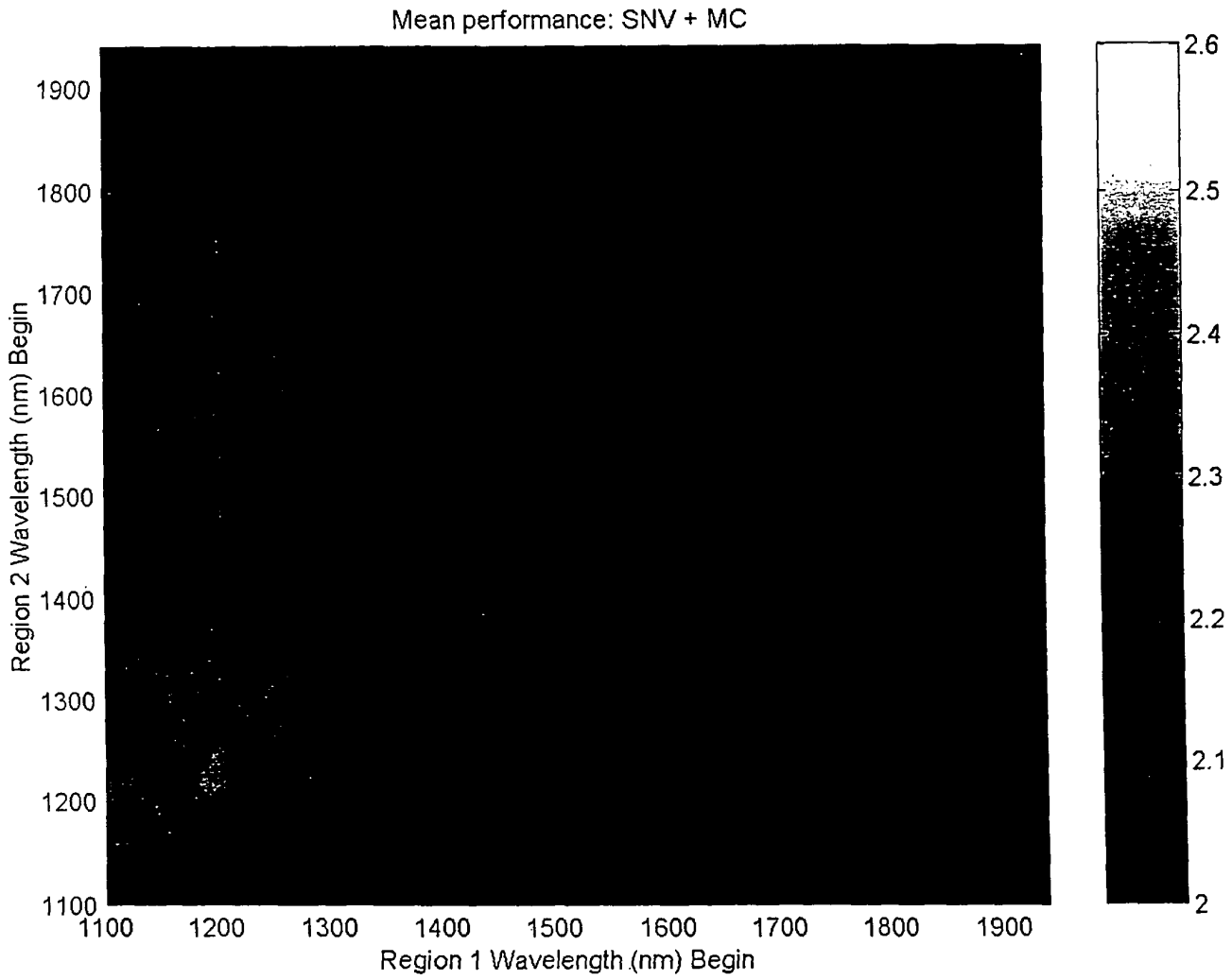

Mean performance: SNV + MC
Region 2 Wavelength (nm) Begin
1900
1800
1700
1600
1500
1400
1300
1200
1100
1100
1200
1300
1400
1500
1600
1700
1800
1900
Region 1 Wavelength (nm) Begin
2.6
2.5
2.4
2.3
2.2
2.1
2

FIG. 8A

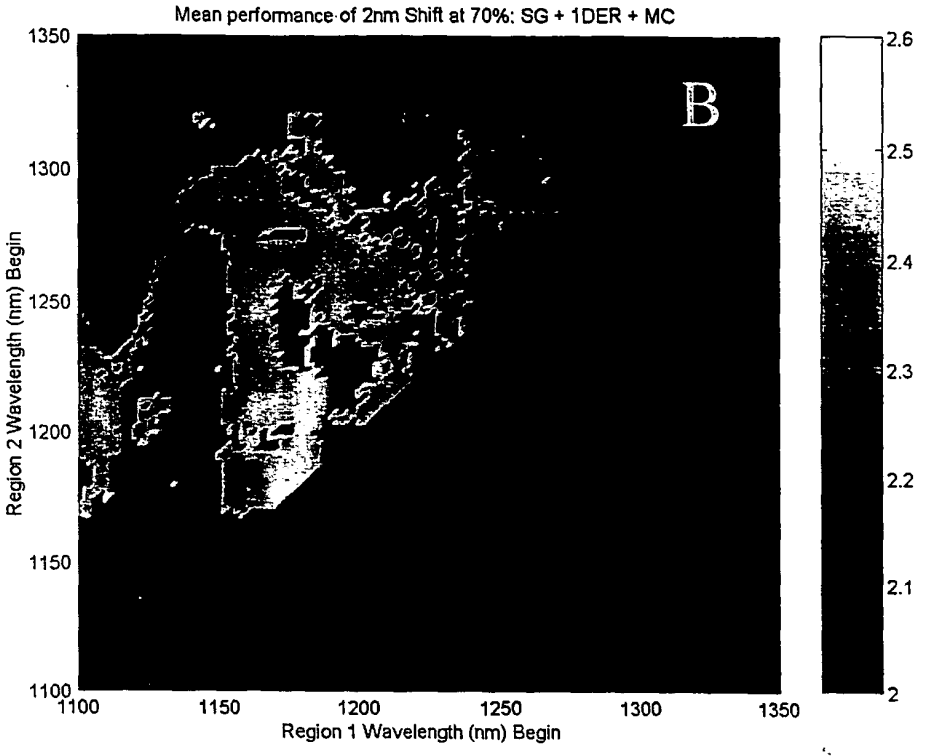

Mean performance of 2nm Shift at 70%: SG + 1DER + MC
B
Region 2 Wavelength (nm) Begin
Region 1 Wavelength (nm) Begin
1350
1300
1250
1200
1150
1100
2.6
2.5
2.4
2.3
2.2
2.1
2

FIG. 8B

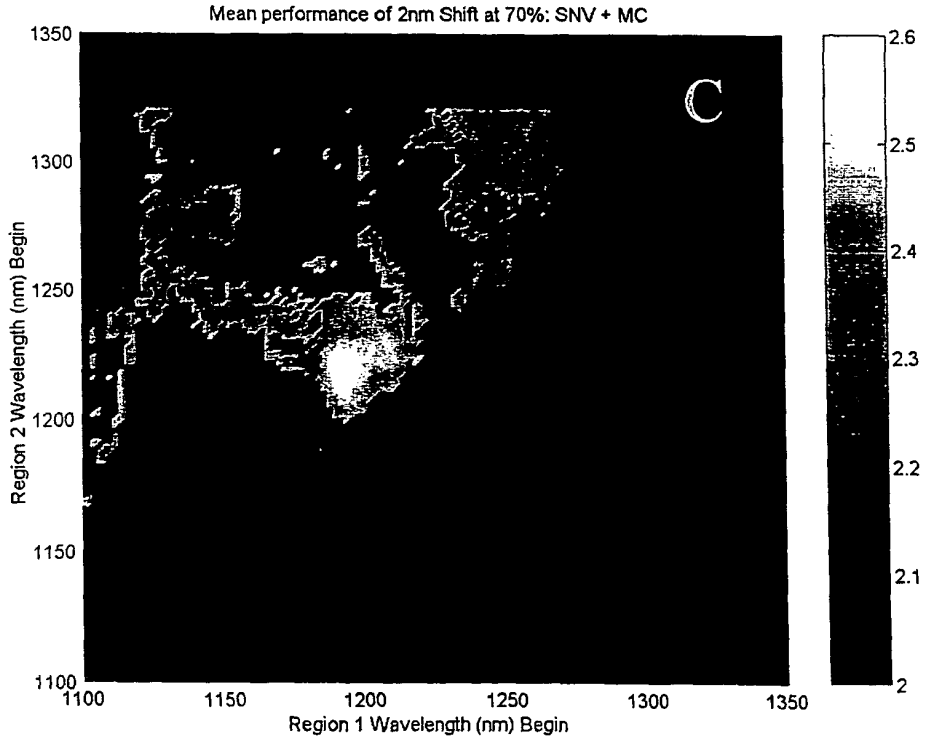

Mean performance of 2nm Shift at 70%: SNV + MC
C
Region 2 Wavelength (nm) Begin
Region 1 Wavelength (nm) Begin
1350
1300
1250
1200
1150
1100
2.6
2.5
2.4
2.3
2.2
2.1
2

FIG. 8C

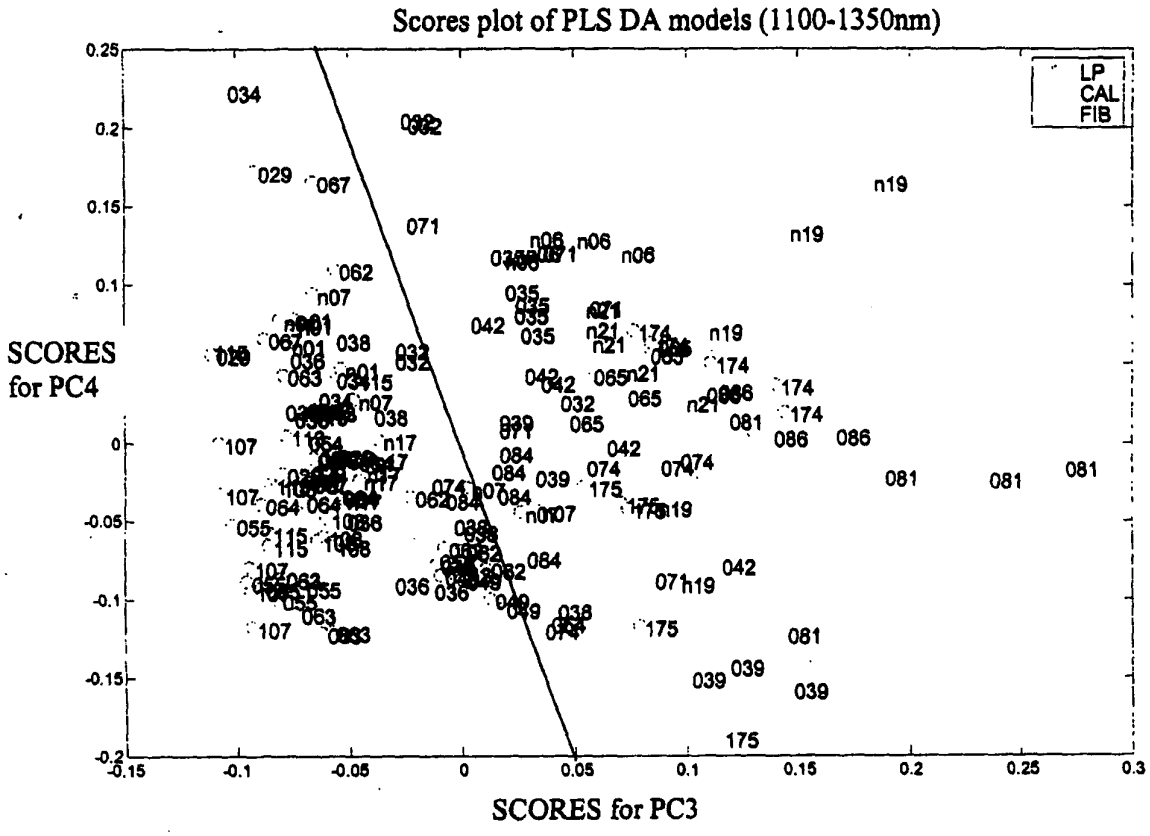

Scores plot of PLS DA models (1100-1350nm)
SCORES for PC4
SCORES for PC3
LP
CAL
FIB
0.25
0.2
0.15
0.1
0
-0.05
-0.1
-0.15
-0.2
-0.15
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3

FIG. 9

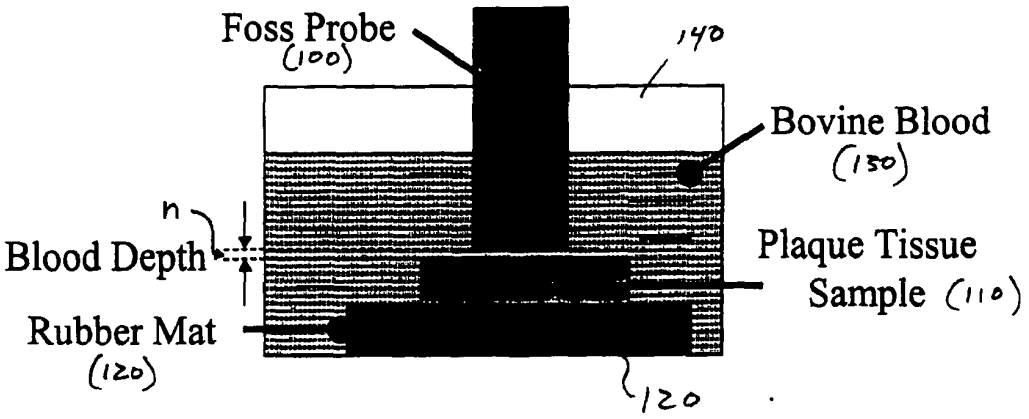

Foss Probe
(100)
140
Bovine Blood
(130)
h
Blood Depth
Plaque Tissue
Sample (110)
Rubber Mat
(120)
120

FIG. 10

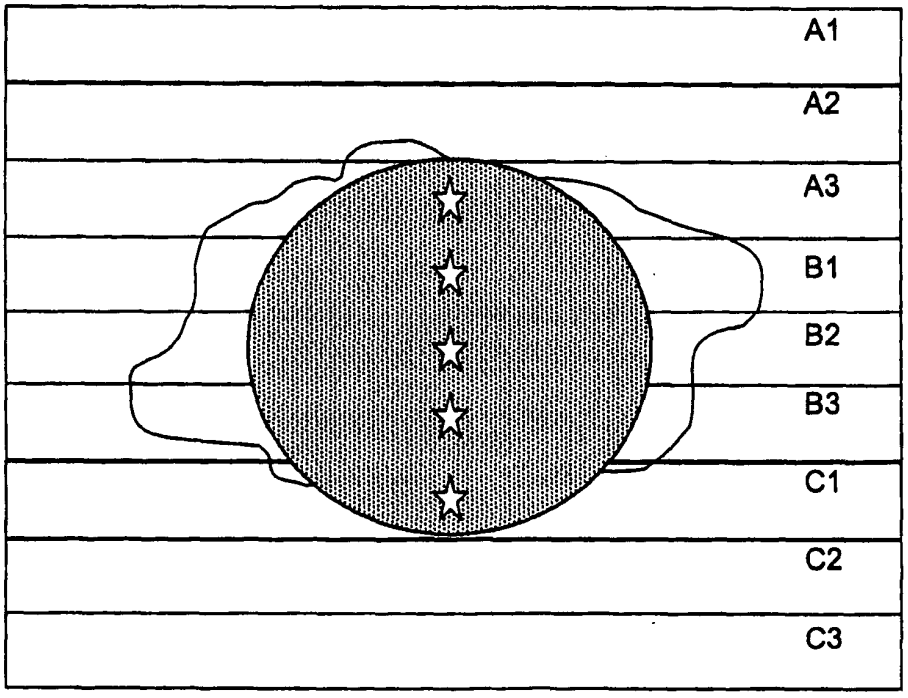

A1
A2
A3
B1
B2
B3
C1
C2
C3

FIG. 11

FIG. 12A

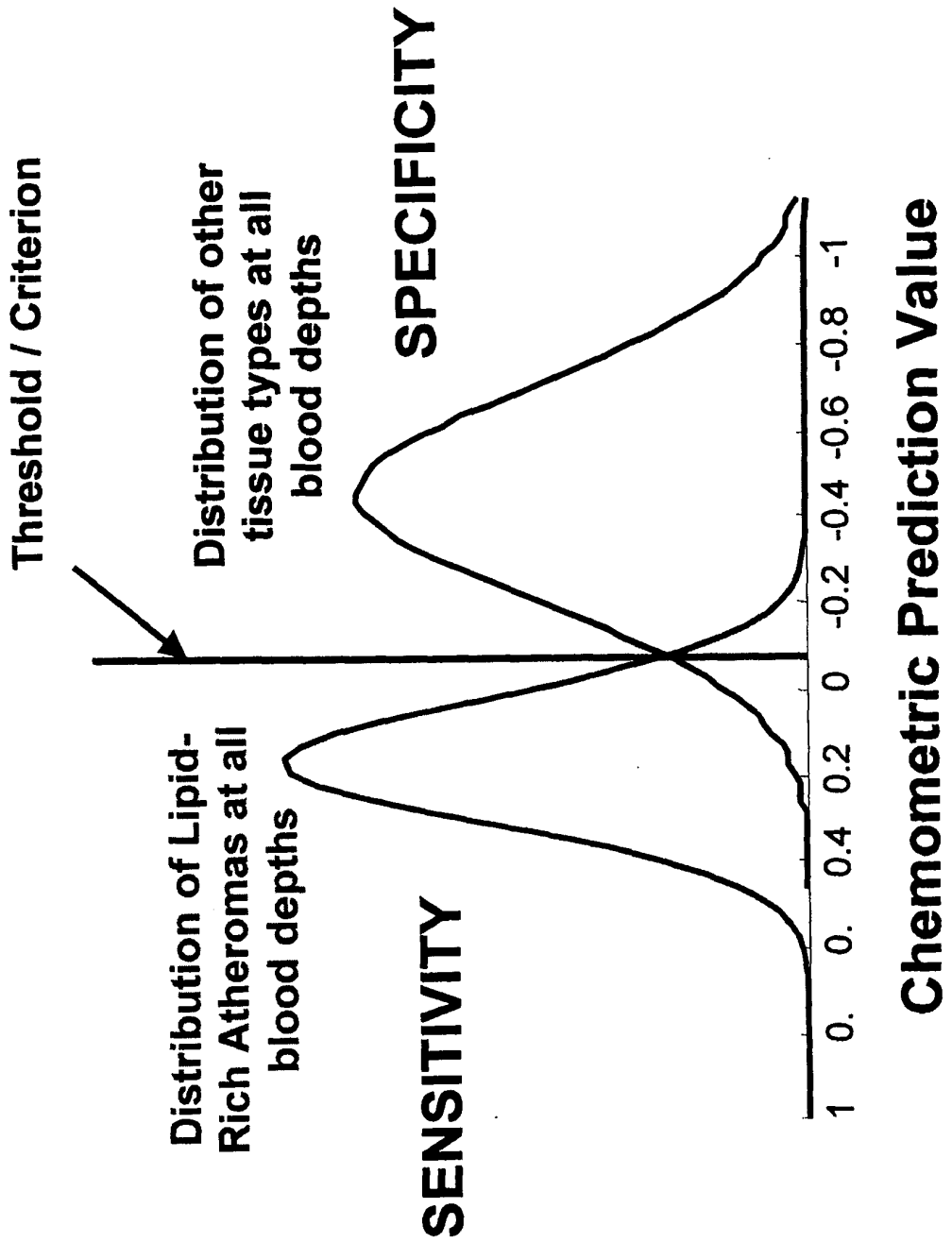

Threshold / Criterion
Distribution of other tissue types at all blood depths
SPECIFICITY
Distribution of Lipid-Rich Atheromas at all blood depths
SENSITIVITY
1 0. 0. 0.4 0.2 0 -0.2 -0.4 -0.6 -0.8 -1
Chemometric Prediction Value

FIG. 12B

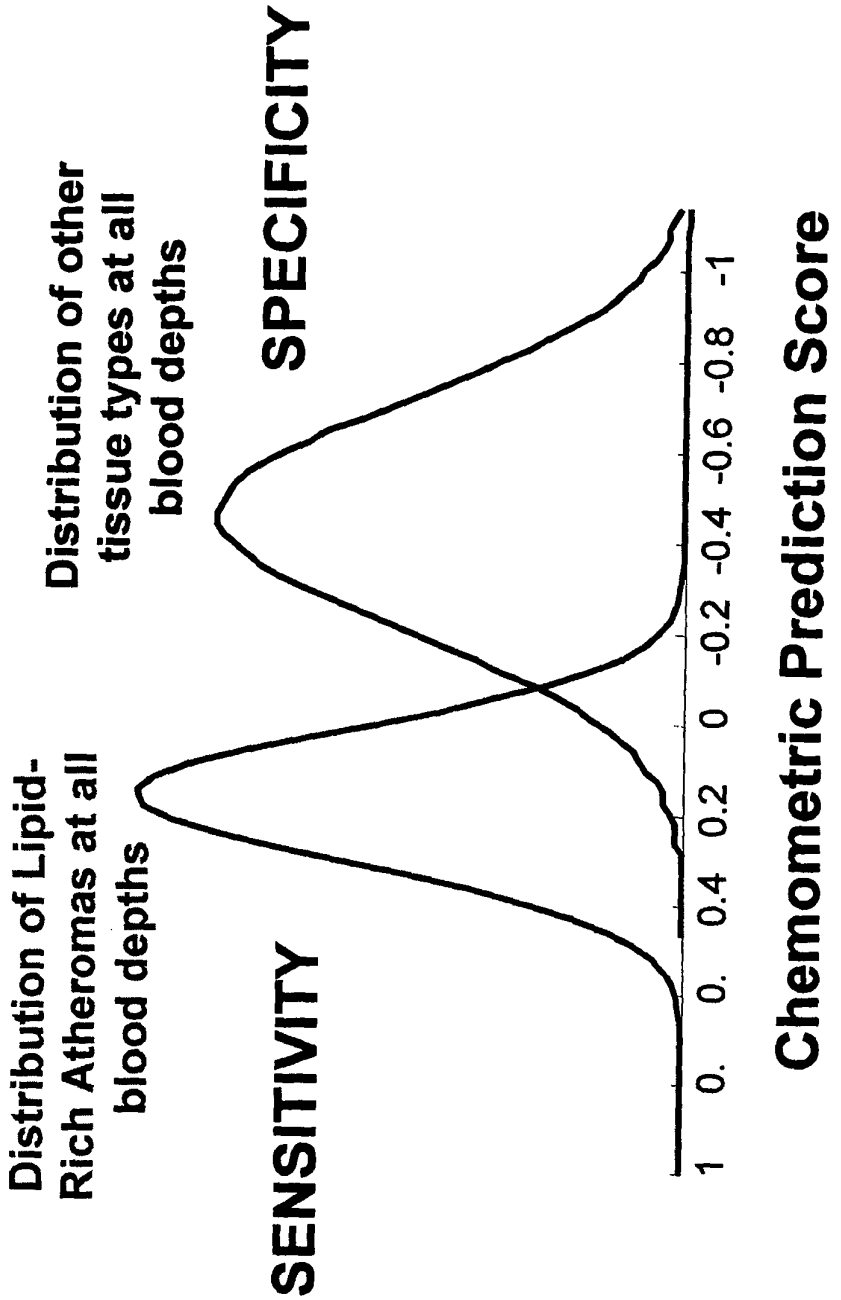
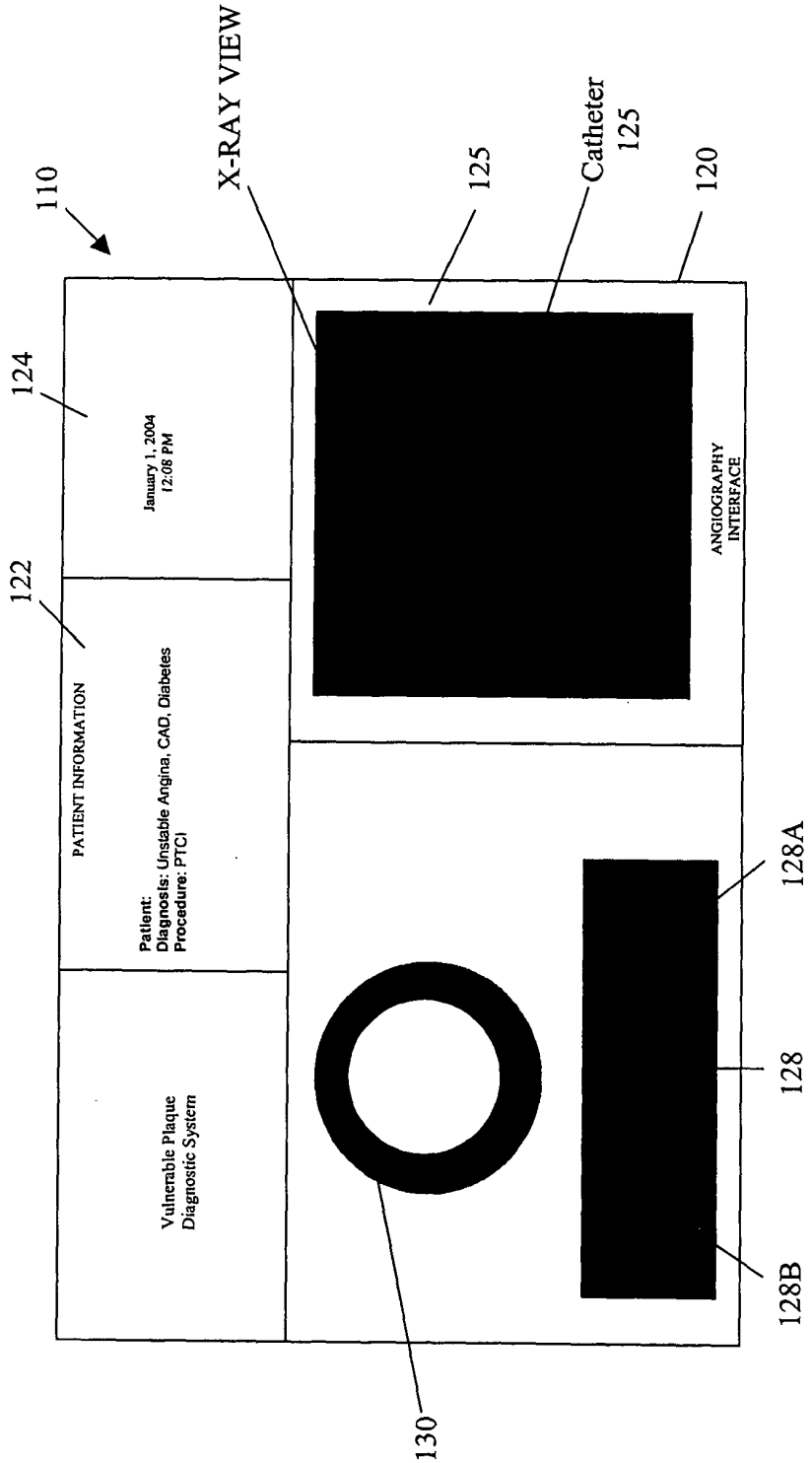

Distribution of Lipid-Rich Atheromas at all blood depths
Distribution of other tissue types at all blood depths
SENSITIVITY
SPECIFICITY
1
0.
0.
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
Chemometric Prediction Score

FIG. 13A


110
X-RAY VIEW
125
Catheter 125
120
124
January 1, 2004
12:08 PM
122
PATIENT INFORMATION
Patient:
Diagnosis: Unstable Angina, CAD, Diabetes
Procedure: PTCI
ANGIOGRAPHY INTERFACE
Vulnerable Plaque Diagnostic System
128A
128
128B
130

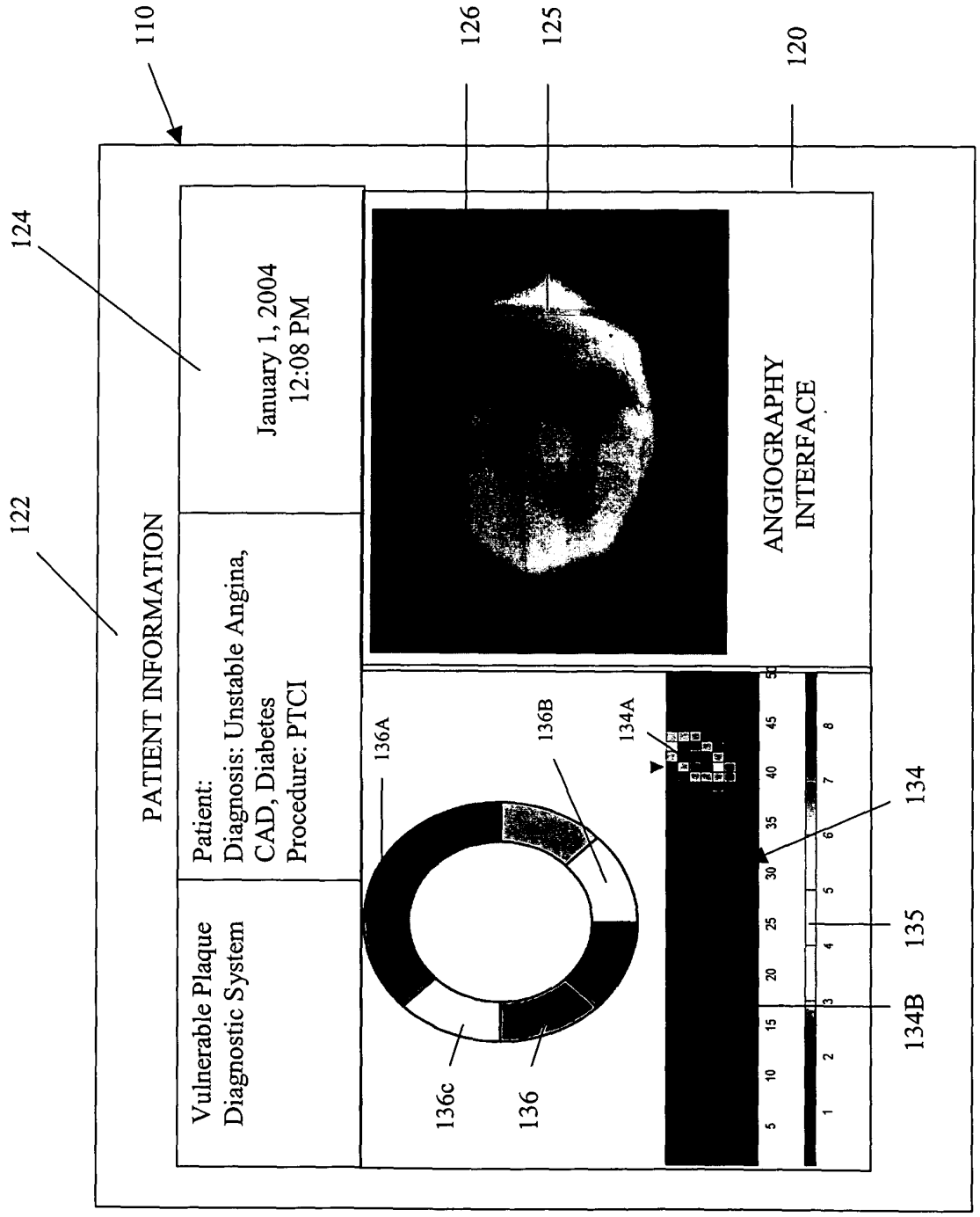
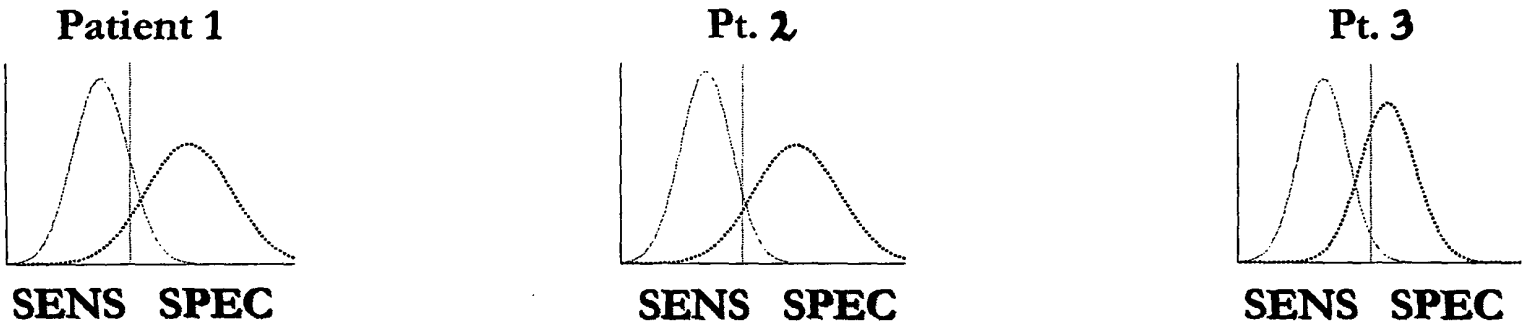

110
126
125
120
124
122
PATIENT INFORMATION
Vulnerable Plaque Diagnostic System
Patient:
Diagnosis: Unstable Angina, CAD, Diabetes
Procedure: PTCI
January 1, 2004
12:08 PM
ANGIOGRAPHY INTERFACE
136A
136B
134A
136c
136
134
135
134B

FIG. 13B



A single threshold classifies tissue into one of two groups, and may not be optimal for all patients, due to inter-patient variations. Displaying data directly allows operator to decide upon a threshold after taking individual patient considerations into account.

FIG. 14

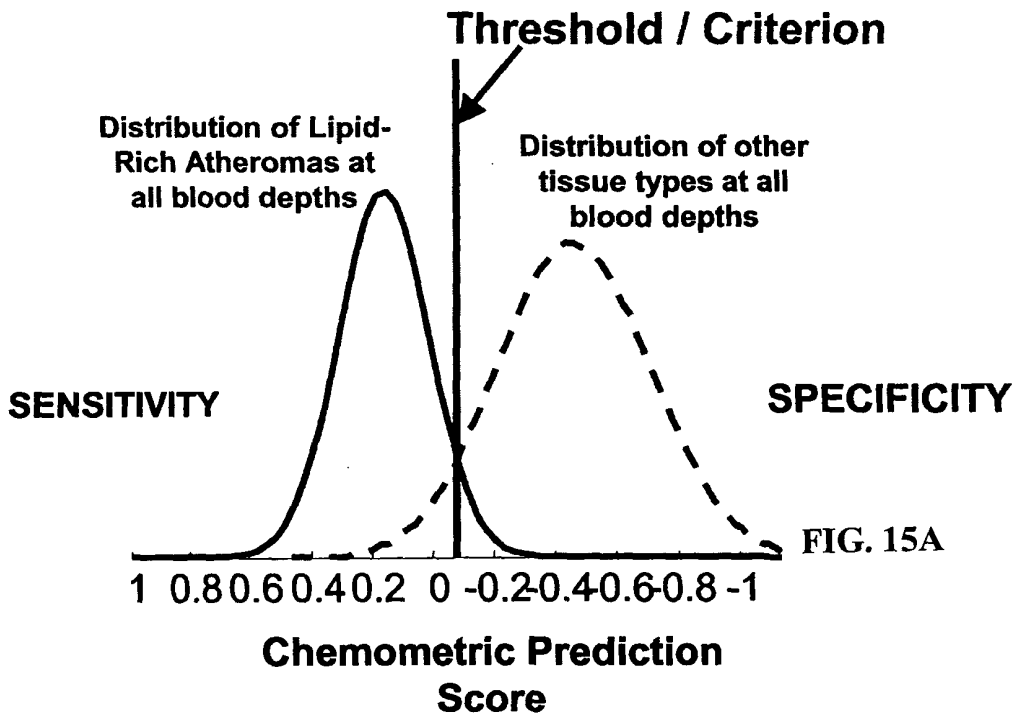


FIG. 15A

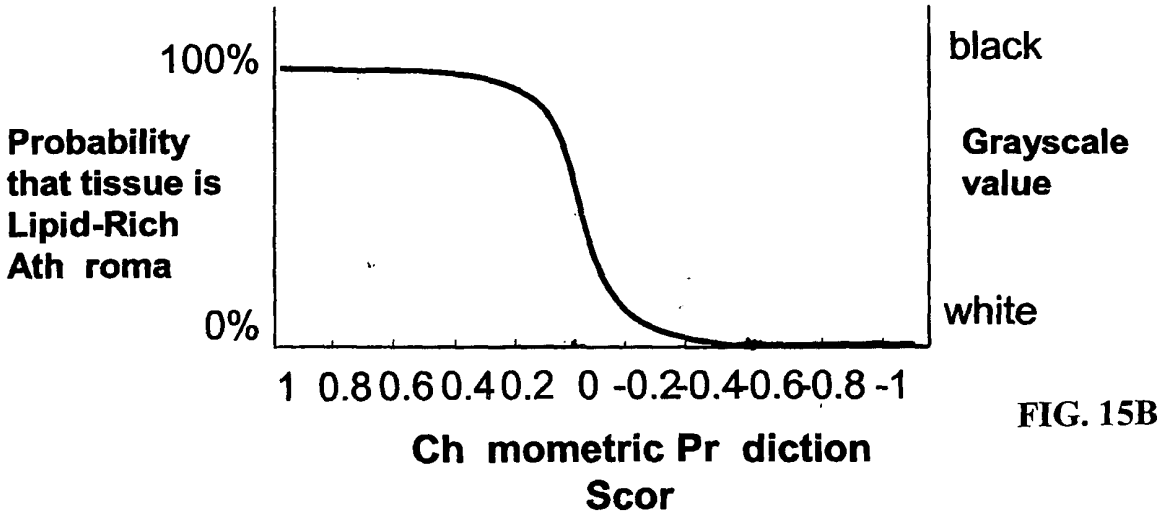


FIG. 15B

From the distribution of chemometric scores of known populations of tissue samples, one can calculate the probability that tissue with a given score is in each group. As an alternative to displaying the chemometric prediction scores directly, the probabilities may be displayed, thus providing more of a visual differentiation at the overlap between the two tissue distributions

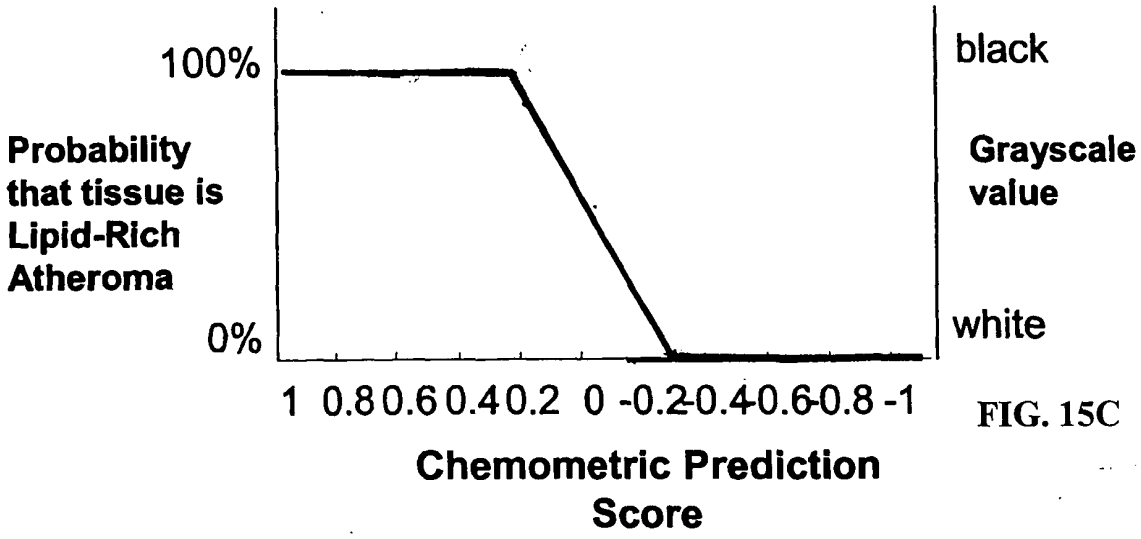


FIG. 15C

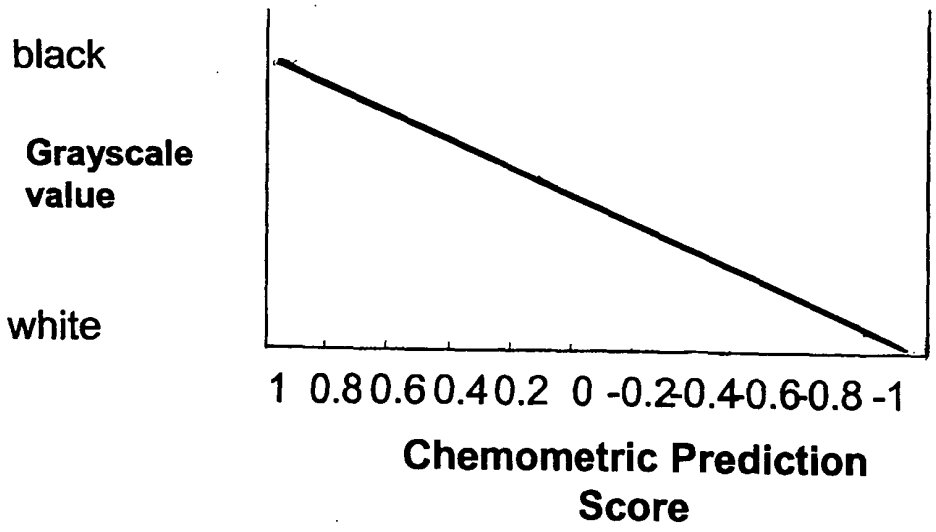


FIG. 15D

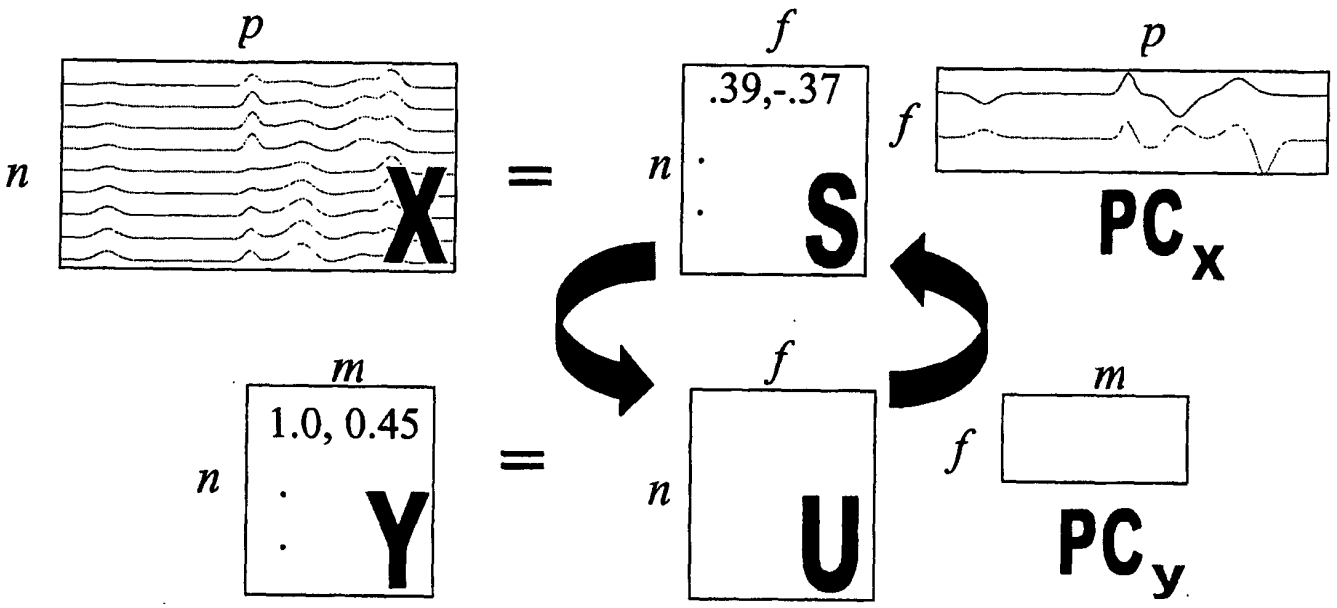


FIG. 16